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**IMPROVEMENT OF SERVICE OFFERING
LINKED WITH CUSTOMER SATISFACTION IN
THE POWER ELECTRONICS FIELD**

A case study for

Vacon

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Abstract

Importance of production strategy in the 21st century in global business is growing. This paper supports the view that dynamic capabilities can be used successfully for improving company's efficiency. Effective information flow, flexibility, speed and responsiveness need more focus in a fast changing world. Delivery accuracy is the key, while short delivery time is a competitive factor. This Thesis is a case study research related to customer satisfaction, which focuses on more effective service improvement and changes in regards with meeting the customer needs. Through empirical approach and related enterprises investigation, based on employees' perspective and end-user' perspective, it designs a questionnaire system to collect data. In a case company, totally 31 interviews were made from 18 subsidiaries and 13 from end customers. Finally, we use statistical analysis to analyze the collected data and draw a conclusion.

This thesis may help manufacturing firms to improve their value added services in addition to operating closer to their global customers. The main focus of this thesis is on power electronics business segments. To make wider conclusions, more empirical studies are needed. The results of this thesis may bring additional value to the previous studies regarding company strategy, Business environment, Innovativeness and operational excellence.

Key words: Overall customer satisfaction, service offering, service quality improvement, effective information flow, dynamic capabilities.

1. INTRODUCTION

1.1 Background:

As we all know, the most common objective to any firm's economic analysis is the concept of product maximization (Milgrom and Roberts, 1992). Economics of production is the core stone of any process when it comes to accomplishing profit maximization (Rudberg, 2002, p. 11). The process of production is described as the whole set of operations and manufacturing needed to support the creation and the existence of a certain product. Meanwhile, factors such as economics in manufacturing concentrate on different allocating problems. This concentration is mainly on topics such as optimal use of productive resources within the production process. However, one should always keep in mind that the customer satisfaction is of an immense importance, if not the most important factor. Hence we can state that Production strategy is a rather crucial component amongst firm's strategies in addition to establishing objectives and actions aimed to guarantee competitive advantage over other firms (Fine and Hax, 1985).

Contemporary to company's environmental discoveries, such as market and customers, the fusion of priorities focused upon generating products is the next crucial aspect of production strategy and customer satisfaction (Rudberg, 2002, p. 11). Moreover, in order to be competitive, a company is obliged to figure out what and which decisions have to be made along with their results, so that the execution of the production process is in accordance with the budget and also the customer's need (Rudberg, 2002, p.11). Rudberg defines the main aim of manufacturing strategy research as following: *"...establishment of a structured framework so that the right decisions are made to fulfill the manufacturing task and thereby deliver competitive products, which in turn offers possibilities for the manufacturing company to make money"*

During the past few years, the challenge to raise the profit level has increased in various firms. These manufacturing companies are striving to expand the value-added chain and

work closer to the end customers (Karlson, 2007). At the moment, the service programs are of a crucial importance in different manufacturing sectors. Putting stress on customers' point of view related to service quality is important for increasing the customers' satisfaction and enhancing the company's value added. Along with all the improvement in customer's business situation, their requirements are changing and shifting from mass production to depth of customization, with high regards to quality and flexibility. Hence, it is important to improve and enhance company's dynamic capabilities by understanding the customer requirements and provides them with products and services which they need reduce the total cost and continually increase the customer's satisfaction.

Different manufacturing companies deliver their products along with offering after-sales services. One should always keep in mind that improvement in the operation strategy leads to an improvement in the company's efficiency in global scales. It also affects the after-sale services positively. Therefore, manufacturing firms aim for marketing their products while striving for a better relationship with the end customers by providing a much higher quality after-sales service. After-sales services do in fact have a very crucial role in manufacturing firms, and this is highly due to the fact that the trend of technology is rather exponentially growing and after-sales services enable the manufacturing firms to gain feedbacks concerning their product and service from customers. This is because of information flow from the customers back to the producers has dramatic influence on improving the quality of the items being produced. In the past few decades this method has been highly used by various service departments. However, with the increase in the advancement of technology in competitive markets, the manufacturing companies are also taking advantage of this method, aiming at improving the production quality in general.

Nowadays, customer loyalties as well as creating growth for opportunities in various markets are as important as selling and marketing the products. Under the circumstances of product technology and quality, after-sales services have become rather important factor affecting the degree of customer satisfaction. At the moment, quite many manufacturing

companies pay close attention to improving customer satisfaction through deeper cooperation with after-sales service (Anderson, E. W., Fornell, C., & Lehmann, 1994). It is crucial to understand the needs of various customers and improving company's after sales performance.

Many researches on customer satisfaction have focused on aspects of quality as well services. It is quite clear that industrial services can have a large variety of demand characteristics in regards with volume, and that can affect the design of the services to be either centralized or decentralized. There is a need for much more and much better detailed investigation for analyzing industrial services offered by manufacturing firm. This thesis is a case study, concentrating on more effective service improvement and changes in regards with meeting the customer needs in the power electronics field.

The main objective of our study happens to be the answer to the following questions:

Q1: Is there a correlation between the below listed factors affecting the overall satisfaction?

- Existing products
- New generation products
- Delivery
- Service offering
- Customer service

Q2: To what extent or percent each of the factors, mentioned previously, are affecting the overall customer satisfaction?

Q3: Are communication and service processes important in overall customer satisfaction?

1.2 Case company introduction

The case company has more than 1300 employees and the revenue of the company is more than 400 million euro per year. The company has a very aggressive growth rate target. The goal of the firm is achieving revenue of 500 million euro and to get an operative profit

equivalent to 14% in 2014. The case company has a 100 percentage focus on frequency converters (AC drives). Frequency converters provide steeples control of rotation speed for electronic motors. Frequency converters have many benefits, such as:

- Ability to saving considerable amount of energy in electric motor applications.
- Reduction of carbon dioxide emissions.
- Rreduction of the load on the electricity network.
- Reduction of the mechanical stress on machinery while starting an electric motor.
- Easing the connection of electric motors to automation systems.

The case company has the duty of developing, manufacturing, marketing and servicing the low voltage AC drives in the power range of 0.2 – 5,000 kW, from the simplest to the most demanding application. The case company is a suitable example of a company, which has followed its strategy very successfully and has been able to develop its operations to be more agile. As mentioned earlier the company focus is 100% on frequency converters and it has seen profitable growth since 1996, a year after when they started to manufacturing frequency converters. The frequency converter is a product which is mainly used for controlling the speed of electric motor. The unit converts fixed frequency and fixed voltage which are coming from supply network into a variable frequency and voltage with the purpose of controlling the speed of the motor.

The main goal of the company is providing a wide range of products and product features to customers which correspond efficiently to the mass production efficiency. At the moment, the case company has product development centers and factories within Finland, China, USA and Italy. The company is growing quite rapidly and it may be possible to see more factories in the future. According to company, the strategy for the year 2014 is to grow up to 500 million euro in revenue and targeted earnings before interest and taxes are

fourteen percent. This leads experts to believe that the company is one of the fastest growing companies in their own business segment.

1.3 The purpose

Due to tightening competition and business turbulence as well as changing customer's needs, firms need new capabilities in the future to be competitive. Customer's needs should be more deeply understood, and Firms should react faster to the changes around the company. Firms need to be more innovative, that requires more than just cheap labour force (Xiaonian X, 2012), and such a new advantage could be dynamic capabilities. Teece (2012) has been defining dynamic capabilities as ability to integrate, build, and reconfigure internal and external resources and competences in a rapidly changing business environment.

Although the link between organizational performance and firm performance is well researched, and these are typically connected to the strategy structure performance, only little empirical research has investigated how customer needs can be linked to the firm's dynamic capabilities and strategy process. Porter (1985) defines that there are two types of competitive advantage: cost leadership and differentiation. This study focuses on the end customers and the elements, which are important for them in a tightening completion. Wilden et al. (2013), propose that dynamic capabilities framework consist of three major elements: organizational structure, organizational performance and competitive intensity (Wilden R, Gudergan SP, Nielsen BB, 2013). Based on their definition, dynamic capabilities, organizational structure and organizational performance are internal and competitive intensity is external. Companies, which want to follow an operational excellence strategy need competitive product price, customer perceived quality and lead time, and on time delivery for purchasing. (Kaplan R, Norton D, 2001). To work different way than competitors, companies can create success, Ravishankar et al. (2012), suggest that this could be for example modularity linked to the strategic making abilities (Ravishankar MN, Pan SL, 2013).

Companies should organize their operations so that they can make fast changes in their own organization as well as in their partnership network, to react to the changes happening around the company. This includes very widely company's processes, for example product creation, production and supplier network. The former requires more resource work to understand the connection between mentioned elements. Winter (2012) has noticed that there is only little empirical evidence that network effects the market success of new products. (Winter S, 2012). To be competitive in such turbulence environment, companies should organize its operations in a way, that they would have a fast response to the changes in the market. Many industrial producers are changing their business models into the long-term client solution (Pekkarinen O, Piironen M, Salminen RT, 2012).

There is a broad unanimity in the literature that dynamic capabilities contrast with ordinary capabilities by being concerned with change. This research includes questions related to delivery time, delivery accuracy, and scope of offering, product technology, and availability of information, product customization, product performance and quality. The central research question of this paper is what are the main elements, in customer point of view, that company should take into account in the strategy? The author examined this main question in three steps. The first step is to understand the key elements which are important for the customer. The second step is to analyse reliability of the answers. The third step analyses the correlation between satisfaction of products and satisfaction of services. This step answers the sub question; is there correlation between satisfaction of products and satisfaction of services?

LITERATURE REVIEW

In a fast changing business environment, firms should figure out new ways of working and encourage people to be innovative in order for finding new solutions. In a rather turbulent business environment, the immense importance of innovation will increase and knowledge is one of the most critical inputs to innovation process (Zheng S, Zhang W, du J, 2011) . Information sharing concepts are important factors for reaching results and deliver right products to the marketplace. Ayers et al. (2001) tested a model suggesting that new product success is the function of the relational norms and integration between stages of marketing and R&D (Ayers JD, Gordon LG, Schoenbachler DD, 2001). The research group has stated that the new product development success was directly related to the presence and strength of relational norms. Their study also found a positive effect in collaborative relationship between R&D and marketing. We can find several studies focusing on the information flow and importance of co-operations between divisions and departments (Burroughs JE, Dahl DW, Moreau CP, Chattopadhyay A, Gorn GJ, 2011).

Information sharing and decision making in a global company is not necessarily easy to handle. Several automotive companies are using product platform design process where they handle information very systematic way (Bech S, Pedersen OJ, 1999). The challenge is that market needs are changing all the time and it is difficult to estimate customer behavior. Flexible product platform concept has been developed to solve this complex problem. Flexible product platform concept helps to handle product variations and modifications are done in a systematic way with sharing widely used modules in different car models (Shi X, Li LX, Yang L, Li Z, Choi JY, 2012). In summary, it can be concluded that for an environment where there are many changes like volumes variation and the need to individualize products according to customer need, information sharing and co-operation between different teams are crucial (Suh ES, De Weck OL, Chang D, 2007).

Customer satisfaction is a direct result of providing goods and services as well as qualified information, which meet and exceed customers' needs. Many of the reclamations are

related to company's Total Quality Management (TQM) (Bauer, H, Falk, T., & Hammerschmidt, 2006). It is worth mentioning that TQM had been widely used during the past few decades and is recently replaced by more advanced methods such as Mass Customization and Lean Production. Meeting customers' requirements, and consequently assuring customer satisfaction, are ultimately the responsibility and the main task of the manufacturing firms (Patterson, P. G., & Spreng, R.A, 1997). During the last decades the researchers have collected a number of studies on customer satisfaction and service quality. This case study focuses on the following dimensions:

- (1) Focuses on the literature to explain the importance and necessity of customer satisfaction.

Bearden and Fornell, for instance, pointed out that customer satisfaction is directly resulted from repeat sales, positive spread of information, and the concept of customer loyalty (Khatibi, A. A., Ismail, H., & Thyagarajan, V, 2002). Higher market share and profit can be driven from high customer satisfaction rate, which leads to a much stronger compatibility and competitive advantage (Landrum, H., & Prybutok, 2004). Consequently we can claim that improvement in service quality, value perceived, and customer satisfaction leads to more success and competitive advantage (Wang, Y., Lo, H. P., & Yang, Y, 2004). It is quite obvious that the customer satisfaction happens to be the main objective of various manufacturing corporations (Kristensen, K., Martensen, A., & Gronholdt, 1999).

- (2) Discussion of various elements influencing customer satisfaction.

Anderson, Fomell, and Lehmann, claimed that service value is one of the most important aspects when it comes to dealing with customer satisfaction (Fornell C, Johnson MD, Anderson EW, Cha J, Bryant BE, 1996). Zeithaml and Bitner found that customer satisfaction is quite strongly influenced by the following factors:

- Service quality
- Product quality
- Price
- Personal and situational factors

Cronin et al. and Kristensen highlighted the fact that customer satisfaction is heavily influenced by factors differentiated from service quality (Cronin, J, Brady, J, Michael K., Tomas, G., & Hult, M, 2000). Similar conclusions have been argued in the studies of website and online shopping (Bauer, H. H., Falk, T., & Hammerschmidt, 2006). These researches backed up the view that service quality affects customer satisfaction in a positive fashion.

(3) Highlighting various methods for evaluating customer satisfaction and service quality.

Meuter, Ostrom, Roundtree, and Bitner put forwards various methods of customized service improvement with the purpose of increasing the rate of customer satisfaction (Meuter, M. L., Ostrom, A. L., Roundtree, R. I., & Bitner, 2000). Christian and Bettina have introduced a scale by which we can measure the industrial customers' satisfaction. That scale can be used in various situations and different product categories (Fornell C, 1992).

2.1 Manufacturing and production planning and strategy

The roots of the word strategy are said to be mainly coming from strategies meaning warfare in the Greek language (Bengtsson and Skärvad, 2001, p.11). From the roots of this word, we can observe that it has been previously used for military concepts. However, in today's terms, we can claim that manufacturing strategy is the art of combining and using the resources of a firm by the aim of fulfilling the main objective of the company

(Kristensen, K., Martensen, A., & Gronholdt, 1999). It is very usual to find various levels of strategies within a manufacturing firm. However these strategies are not necessarily sharing a common objective. Medium to large size manufacturing firms and companies are mainly comprised of a number of business units deep inside their organization. These business units are predominantly bearing the responsibility of satisfying different units of the market (Park, C.H., & Kim, Y, 2006).

From the above paragraph, one can always come to a conclusion that each and every unit of business should be capable of developing its own specific strategy dealing with the market segment, this is said to be the strategy in the business level (Hill, 2000, p. 26). It is worth mentioning that the functional level of strategy is said to be the lowest level (Hill, 2000, p. 27). The main objectives of the functional level of strategy are the development and investment on those segments of the market for which the company is competing for either in the present or the future. The most vital competencies for the survival of the firm are also considered on this specific level



Figure 1: Various elements of corporate strategy.

Various functions are being taken advantage of for the fulfillment of the missions within an organization (Hill, 2000, p. 27). In the above figure, we can observe seven different functional strategies, which are considered to be quite relevant elements related to corporation strategy in a highly competitive market. One should always bear in mind that firms and corporations are not made of different parts or functions but they are considered to be and working as whole (Hill, 2000, p.27). Hence it is a crucial task to remodel or reshape the various functional strategies into a rather uniform strategy which is accompanied with harmonized objectivities. Today's competitive and ever changing market highlights the fact that mutual development as well as functional strategy integration is needed much more than ever before. However some researchers such as Hill (2000) claim that in reality, best strategies are conducted rather separately and in ways other than the rest of the strategies.

The concept of manufacturing being considered as a strategic weapon goes back to almost five decades ago, when various researchers did not distinct between the marketing and manufacturing strategies. Back in those days, manufacturing strategies were considered to be the most crucial factors in the marketing strategies (Miller & Roth, 1994). Skinners in 1969 put forward the whole idea of manufacturing strategy being separated but somehow being the most important component in marketing strategy.

“Production strategy basically highlights the competitive advantage which is necessary for production. It is capable of analyzing the whole manufacturing process linked to the capability for providing this advantage. This does not necessarily stand for the short-term, operational details of cost but also for quality as well as delivery. Moreover it puts forward a set of structural decisions which are internally designed by the aim of forgoing production into a tool for strategy” (Skinner 1986)

In production strategies, the main and the most important component is how the firm can be and continue competing instead of merely concentrating on the productivity level (Skinner,

1969). It is worth mentioning that, it's a rather common mistake to consider cost and efficiency as the main objects or cornerstones of manufacturing strategy (Skinner, 1969).

Leong et al. (1990) puts forward the idea of research in the area of production strategy by mentioning that the research related to business contents has long been highlighted between research with the ideas about strategy and on the processes related to strategy. However, this highlighting has not been referred to merely production strategy concepts. This situation has been known from time to time by various researchers as being a danger to the swift advance of the whole field. Moreover, the researchers believe that failing to identify each of the mentioned dimensions in their own separate ways or even mixing them is more than likely to lead to mistreatment of either process or both of the contents.

Fahey and Christensen (1986, p. 168) has highlighted the distinction between these concepts as following:

“Content’s main focuses is on the details of the made decisions, however process deals with how these decisions are attainable in the organization.”

One can always assume the content and process of different methods to rather varying from one another. Various objectives and activities are believed to be the main concern of operation strategy. The content of operations strategy is the main method which is used in various specific factors for decision making. (Karlsson, 2001, p.16). According to various and already existing proves consensus have gone beyond the advanced in regards to the process models (Leong et al., 1990). Moreover, production strategy has been going through various tests in the area of empirical evaluations by various researchers (Leong et al., 1990).

2.2 MANUFACTURING STRATEGY PROCESS

The process involved in manufacturing strategy is mainly dealing with the development of these very strategies. The mentioned process is mainly containing the two following approaches:

- The first approach belongs to the Top to down, market based. This process is objectively said to be rather hierarchical. This means that the strategy of the company forms the context of the whole strategy for a very specific business unit. The next stage belongs to structuring the functional strategies (Bröte, 2002, p. 49).
- Various researchers such as Hays (1985) believe otherwise. These researchers put forward a new market based-model which is based on an inside-out or down-top resource based. This method focuses mostly on the developing, and protecting company's principals in comparison to the model which is based on the market. This happens by putting forwards a down-top resource-based. In this method, the functional capabilities are the main drive for strategy of a firm (Leong et al., 1990). The approach in accordance with the resources introduces focusing on the process of development is more profitable when it comes to protecting the unique operations of a company by the aim of change the rules of competition (Gagnon, 1999).

2.3 The content of production strategy

The main model of production strategy can be categorized to three wide elements (Leong et al., 1990; Dangayach and Deshmukh, 2001) (1) competitive priorities which are based upon the firm's goals (2) categories of decision making consisting of long term importance in the area of manufacturing and manufacturing function and (3) Strategic linkage. These groups basically form the production strategy of a corporation.

(1) Competitive Priorities

- Cost
- Quality
- Delivery
- Flexibility

(2) Categories of decision making

- Structural
- Infrastructural

(3) Strategic Linkages

- Internal Fit
- External Fit

The factors related to competitive priorities and categories of decision making basically form the production strategy guidelines of a firm (Olhager and Rudberg, 2002).

2.3.1 Competitive Priorities

The term “competitive priorities” was put forward by Hayes and Wheelwright in 1984. It was defined as a vital preference, or the dimensions which is chosen by the company by the aim of surviving and also competing in a highly competitive market. The competitive priorities of this field were named as following: (1) cost

- Quality
- Delivery
- Flexibility (Krause et al., 2001).

Even by all today's standards, the above mentioned concept still holds. These factors basically are the cornerstone for shaping the competitive strategy (Krause et al., 2001; Boyer and McDermott, 1999). However, for highlighting the differences in competitive priorities, many researchers put forward the idea of order winners and order qualifiers. Through the concept of order winner a product can win in the market. The order qualifiers are said to be the requirements which give eligibility to a firm for keeping its items or

products inside the market. An order winner makes a product win in the market place, whereas qualifiers are criteria that must be provided by a firm to enter or stay in the market. It has been stated by various researchers, such as Wheelwright (1984) that it's quite a demanding task to be competing in all dimensions of the market all at the same time. However this view has been challenged by many researchers (Leong et al. 1990). In the original and traditional trade-off model the mentioned competences are not so exclusive but they are mentioned to be rather cumulative.

As many researchers believe, in today's market the performance should be dealt with in such a way that the cumulateness and exclusiveness coexist instead of replacing each other. An extent amount of empirical research has shown this fact (De Mayer and Bonheure 1991). This can only highlight the fact that the competitive priorities in manufacturing field do indeed exist to relate the manufacturing strategies to the requirements set by the market.

2.3.2 Decision Categories

Skinner in 1969, and Hayes and Wheelwright in 1984 defined manufacturing as a pattern consisted of individual decisions affecting the capabilities of a firm for meeting long-term goals and aims. Fine and Hax (1985) highlight the criticality of fully comprehending the concept of manufacturing strategy. Moreover, they shed light on the fact that the web of decision making should be broken into smaller pieces which enables the researchers to more capable for analyzing the factors. Leong et al. (1990) states that even though the categories for decision making can be differing from one another, the essences of the categories related to manufacturing strategies are quite similar.

As we could see above, the strategic decisions were divided into structure and infrastructure; this was put forward by Hayes and Wheelwright in 1964. One should always bear in mind that the structural decision categories have the responsibility of dealing with

decisions related to capital spending, and infrastructure decisions which affect the people and systems which make the manufacturing system work. This feature of operation strategy has many similarities with the computer systems dealing with Hardware and Software features (Slack et al. 2001, p. 78). The hardware determines what can be done. Through the hardware limits, the software controls how accurately the computer in fact is in usable. The concept of operation basically is consisted of the same principal. It's only through the best operation infrastructure that the facilities and technologies can be effectively put in use (Slack et al. 2001, p. 79).

2.3.3 Strategic Linkage

Interrelations are said to be basically intrinsic to companies assuming that the employees work together for achieving the organization's objectives. Simons (1965) believed that when employees are determined to work as a single unit towards the same objective, a sort of dependency forms between their actions. So one can always claim that it's due to this dependency that the actions of one employee have direct effects on carrying out the tasks by another employee. Hence if communication and information sharing lacks within a company, the outcome can be quite disasters (Lakemond, 2001, pp. 61-62). Information sharing remains to be the most important factor for reaching strategic linkage. It is worth mentioning that company's ability to being in a market also depends on its external and internal fits. These fits are the main factors concerning strategic linkage.

Internal fit mainly deals with achieving complementarities within the organizations (Miller, 1994). Internal linkage is concerned with linking the competitive priorities, in regards with the objectives in manufacturing, as well as the decision categories. Moreover, it assures that the elements related to the decision categories are along the same line with one another for reaching manufacturing goals. Last but not least, the internal fit deals with the market and manufacturing link in regards with the competitive priorities and the marketing factors such as: price, product, promotion and place (Kotler, 1999, pp. 109-111). Within this linkage

one should take into consideration the relation between the variables being interdependence and the process of decision making (Rudberg, 2002, pp. 25-26).

External fit needs that the organizations match their structures and process in accordance to their external setting (Miller, 1992). From the manufacturing point of view, the linkage between the competitive priorities and the customers' requirements is reached via the marketing techniques. The task of the external fit is basically to make sure that the competitive priorities are in the same line with the demand from customers (Rudberg, 2002, pp. 25). The competitive priorities can be used in two main concepts. They are sometimes used to illustrate competitiveness and sometimes used to mark competences. This is respectively dealing with the internal and external fit (Corbett and Van Wassenhove, 1993). Hence, we can conclude that measuring the internal competence without the external competitiveness is not effective for a corporation. Consequently, naturally firms have to handle the marketing aspects for reaching external fit (Corbett and Van Wassenhove, 1993).

Consequently the marketing mix is directly dealing with the competitiveness in the company, meanwhile the manufacturing competitive priorities takes care of the competences developed by the manufacturing functions (Rudberg, 2002, pp. 24-25). One can always claim that manufacturing is considered to be inward whereas marketing is outward perspective. The best way for improving the company's function is to basically combine or mix these two interdependent ideas. By doing this a better fit is achieved hence the company can perform on better levels.

The concept of dependence in a corporation is defined as the degree by which the functions of one department are depending on the other ones. The concept of interdependencies comes to though when two separate units are dependent on each other. This implies that there is a common interest between two sides or two parties (Lakemond, 2001, pp. 61-62).

2.4 Customer satisfaction

Various researchers have linked overall satisfaction with a number of product or service to satisfaction with a certain category of the product or service (Anderson and Sullivan 1993; DeWulf, Odekerken-Schröder, and Iacobucci 2001; Garbarino and Johnson 1999; Oliver 1980; Parsuraman, Berry, and Zeithaml 1988, 1991). Customers can define their satisfaction of a product or service along with a specific criteria's such as the product categories, their price, customer service level, or a mixture of these different factors. The main aim of these studies is to understand the relation of specific types of customer satisfaction and their influence on overall satisfaction. This is mainly done by testing the slope of the regression curve from the regression analysis. It is worth mentioning that various subunits inside a corporation or industry could display various relations among the same views on satisfaction, however there may be slightly different aspects in satisfaction. The following figure outlines the most important steps for reaching customer satisfaction

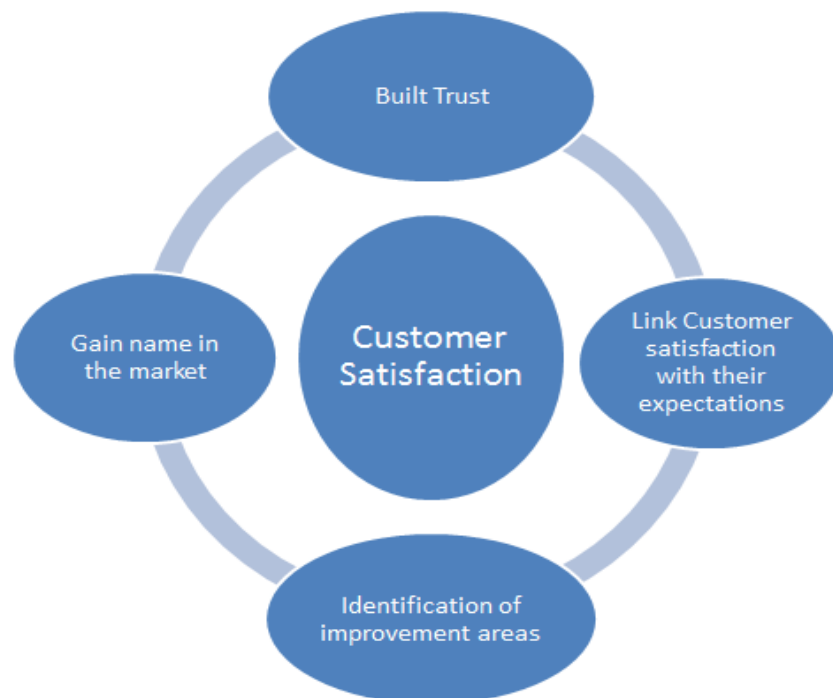


Figure 2: Customer Satisfaction.

The whole idea behind the link between satisfaction and overall satisfaction differs among various subunits, and there are different practical and theoretical aspects to it. In practice, this variation can be crucial when it comes to decision making in marketing fields. It should not be coming as a shock if the customers from crowded areas have more stress on utilities like location. The very same factor could be far less important in low populated areas.

As it is quite obvious, the existence of a firm in a highly competitive market fully depends on the customer satisfaction they can gain during their operating time (Anderson and Mittal 2000; Anderson and Sullivan 1993; Reichheld 1996). According to different Empirical studies customer satisfaction is not merely limited to the products having high or low costs. In fact the quality seems to be the most important factor. This indirectly can reduce the cost since the production pays more attention in better production and the defected items can be less in number (Anderson, Fornell, and Rust 1997; Fornell 1992). Hence, as it was mentioned earlier the most important factor in building trust and long-term satisfaction in customers is improving the quality of the goods and the services offered by the companies and manufacturing firms. The Customer satisfaction which is gained through price reduction is quite unlikely to be around for a long period of time (Anderson and Mittal 2000). However, taking reliability out of a manufacturing techniques or service process does not shift upwards the quality and customer satisfaction in the same way as producing items or services in order to meet the need of customers (Fornell et al. 1996).

2.4.1 Measuring Customer Satisfaction

Even though an upward shift in customer satisfaction seems to be good news for the company, indeed measuring the very customer satisfaction accurately remains to be a big challenge for many companies and manufacturing firms. This topic has been studied in various institutions from individualistic points of view to figure out the main force behind this drive of satisfaction (Fournier and Mick 1999; Oliver 1993; Oliver and Swan 1989). Moreover, the very same institutes and research teams have studied customer satisfaction

from manufacturing and industrial point of view. These studies have been carried out by the aim of comparison between the main two perspectives (Anderson, Fornell, and Lehmann 1994; Fornell 1992; Fornell et al. 1996; Mittal and Kamakura 2001). There have also been so many other researches concentrated upon customer satisfaction from a singular organization point of view (Hallowell 1996; Loveman 1998; Schlesinger and Zornitsky 1991). Also a few researches have been made, examining cross organizationally (DeWulf, Odekerken-Schroder, and Iacobucci 2001). Additionally various specific tools, such as SERVQUAL, have been used for calculating the amount of satisfaction from a specific product or service (Parasuraman, Berry, and Zeithaml 1988, 1991).

It is worth mentioning that, in measuring customer satisfaction, it is highly possible to get different attributes with different satisfaction levels. This can be resulted from different usage contexts from various market segments. Also factors such as the population of the segment and the market environment can cause this variation (Anderson and Mittal 2000). However, manufacturing corporations should always consider the specific segment variations and failing to do so can have negative outcomes for the (Anderson and Mittal 2000). One should always take it into consideration that even if the customer satisfaction rating is the same, the various consumer characteristics might cause different purchasing behaviors (Mittal and Kamakura 2001). Hence, the market segment as well as the customer segment is crucial factors when dealing with and measuring customer satisfaction.

Garbarino and Johnson (1999) once analyzed the role that satisfaction played in low-relational and high-relational and between them. However, it should be mentioned that the study only involved the customers from one corporation and that was the biggest limitation of the study. This thesis considers the factor of customer satisfaction from various sectors of the market. It should be mentioned that the work done in this thesis can be sharing some common field with Anderson and Sullivan (1993) in case of sampling methods. The main aim of all these studies has been to figuring out the outcomes of customer satisfaction rather than finding out the effect of different satisfaction on the overall satisfaction rate. One should always bear in mind that aggregation may display characteristics (Hutchison,

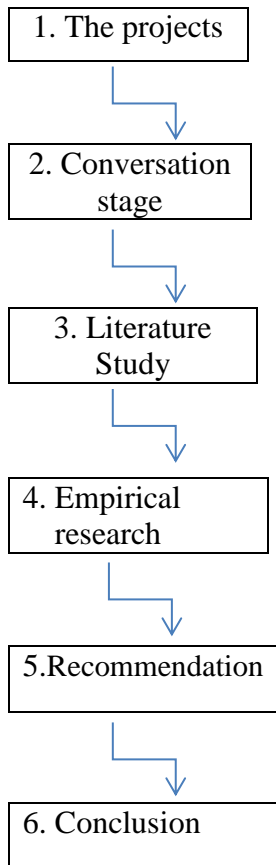
Kamakura, and Lynch 2000). This thesis basically does make the same type of analysis along with solving the mentioned problem with aggregation.

Previously, random-effects have been used to measure the heterogeneity of customers in various single companies. The random-effect models are quite similar to that of hierarchical hence one customer can be dealt with as a subunit (Kekre, Krishnan, and Srinivasan, 1995)

As it was mentioned in the last chapter, many other researchers have studied the heterogeneity of customer satisfaction. It has been also showed that recreation can be an effective tool for to for customer segmentation (Danaher, 1998). In many of the researches customer categories which put different stresses on various service attributes are basically identified. This process is defined as the concept of sub segmentation (Malthouse, 2002). So when a manufacturing company targets a specific segment of a market, the customers or the end users are basically sub segmented into a more homogeneous category (Danaher, 1998).

A crucial concern is that when one approach should be given more importance than the other. There are basically two approaches when dealing with this question. Number one approach is when the managerial decisions and actions are put to practice at a sub unit level. The second approach is when the managerial decisions and actions are implemented when sub units are operating with homogeneity and there happen to be heterogeneity across the very same sub unit. Otherwise the corporation or the manufacturing firm should take actions which are followed by implication within the subunit (Singh, Chintagunta, and Dube 2002).

RESEARCH METHOD



This chapter belongs to portraying the applied research method in this thesis. The design of the study seems to be the main starting point of this thesis. The next step is the method of collecting the secondary data followed by a section belonging to the presentation of the primary data. Last but not least, the analysis of the secondary and the primary data are taken into consideration.

3.1 Research design

The above mentioned table highlights the progress and the accomplishment of this thesis. The model has been designed by the author and has been the corner stone of proceeding in writing this thesis. It is worth mentioning that all the stages, mentioned in the table above are considered to be following a logical pattern and are rather essential for the completion

of this master thesis. In the next following paragraph we shall look into the details of each stage and their relationship with one another.

1. Project

Collecting and examining the necessary background information, in relation with the assignee and the assigner is rather essential when dealing with or performing an external associate such as the thesis (Brown, 2002). This collection of essential data has to be taken care of in the starting stages of the operation. As we can see in the introduction of this paper, the three first sections are bearing the responsibility of fulfillment of necessary information needed for the objectives of the project. One should always bear in mind that understanding the problem is the most essential part in the project stage. In this section factors such as why and for whom the problem exist should be clarified. This is rather important since if the problem is lacking definition and not understood to full extent there is a high risk of divergence between the main concern and the objective of the thesis.

2. Conversion stage

This belongs to the conversion of the project into the problems concerned with the thesis, without affecting the main object and essentials of the project. This stage belongs to the formulation of the purpose of the study. One can always say that the main variable in in this stage is the academic requirements highlighted by the University of Vaasa and the department of industrial management.

3. Literature study

The theoretical frame, represented amongst the chapters of this thesis, happens to be the most important parts when dealing with the literature review. It is worth mentioning that the literature review and the research done on it played the most important role in this thesis from the starting stages. The knowledge which was gained from the literature studies had matured the progression of this study. It is worth mentioning that the direction of the literature review became more specified with the development of the purpose of the paper.

4. Empirical research

The empirical research has been based in the literature study section. This part contains the research method as well as some parts of the empirical data sheets collected during the process.

5. Conclusion

The analysis taking part in this thesis and the research findings are presented as an objective for the normative and descriptive comparison of the findings. In order to meet this objective the discussion and the conclusion section have been formed.

This thesis is mainly based on the interviews kept in case company's sales conference 2011, at Cancun, Mexico. Four people made the interviews during the three days sessions. Two of interviewers were working in the case company and two other interviewers were from Consultant Company. Totally 32 persons were interviewed from 19 different countries. End customers were in 7 different countries, including 13 interviewees. Figure 1 described the data collection process, from getting people to the same place to the conclusion of the results. This research is focusing on the end customer side because strong "customer voice" was the main focus of the research, also internal customers opinions were noticed during the research work. The main motive for the paper is to study customers' needs in a fast changing business environment and connect that information to the company strategy. To have right information directly coming from end customers helps managers and project team members to understand the power of customer voice and to do right improvement actions in next coming period.

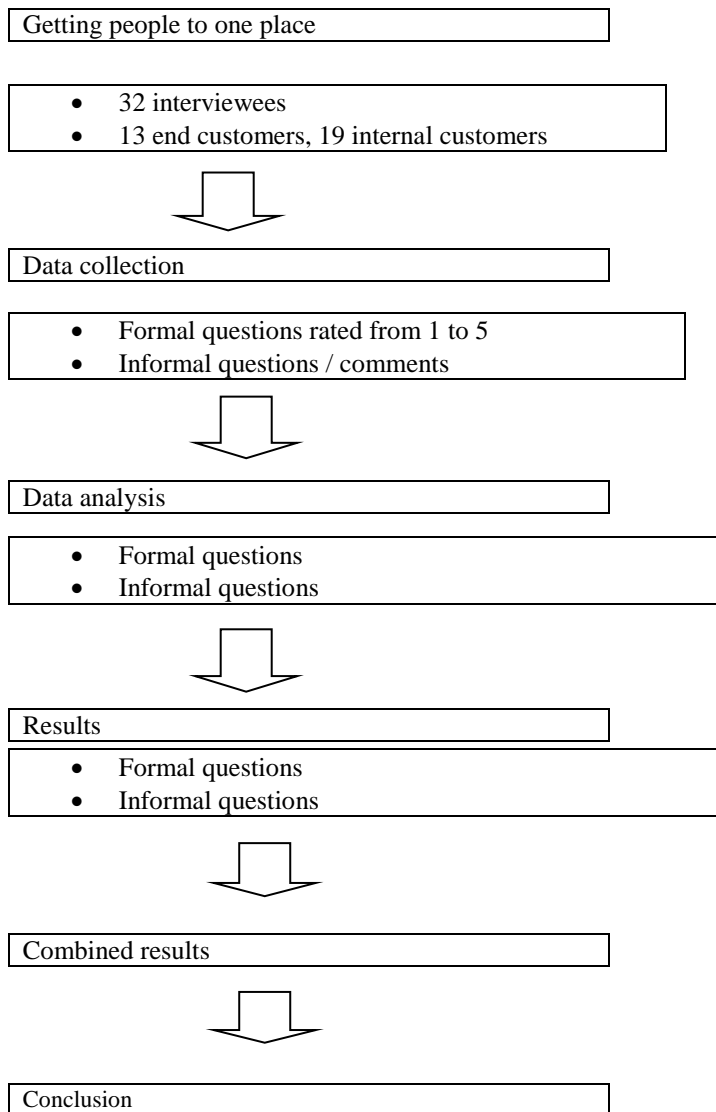


Figure 3: Data Collection Process.

Innovation is one of the key elements to enhance the efficiency of the firm, although the link between technological innovation and business performance is not widely studied. Annavarjula, etc. (2012) have studied relationship between firm's technological innovation capabilities and its international performance (Annavarjula M, Nandialath AM, Mohan R, 2012). The reason to select the empirical research methodology was to an understanding of complex issues in power electronics business. The reason to select the case company was

their long experience on power electronics business and opportunity to study customers' opinions extensively and from different countries. The aim was to study real customer needs, to understand the positioning in a market and to improve case company's operations in the future. For global operated company it is extremely important to make right actions in a fast changing business environment.

The following table is another effort to illustrate the design of the research from the start to the result section of the thesis.

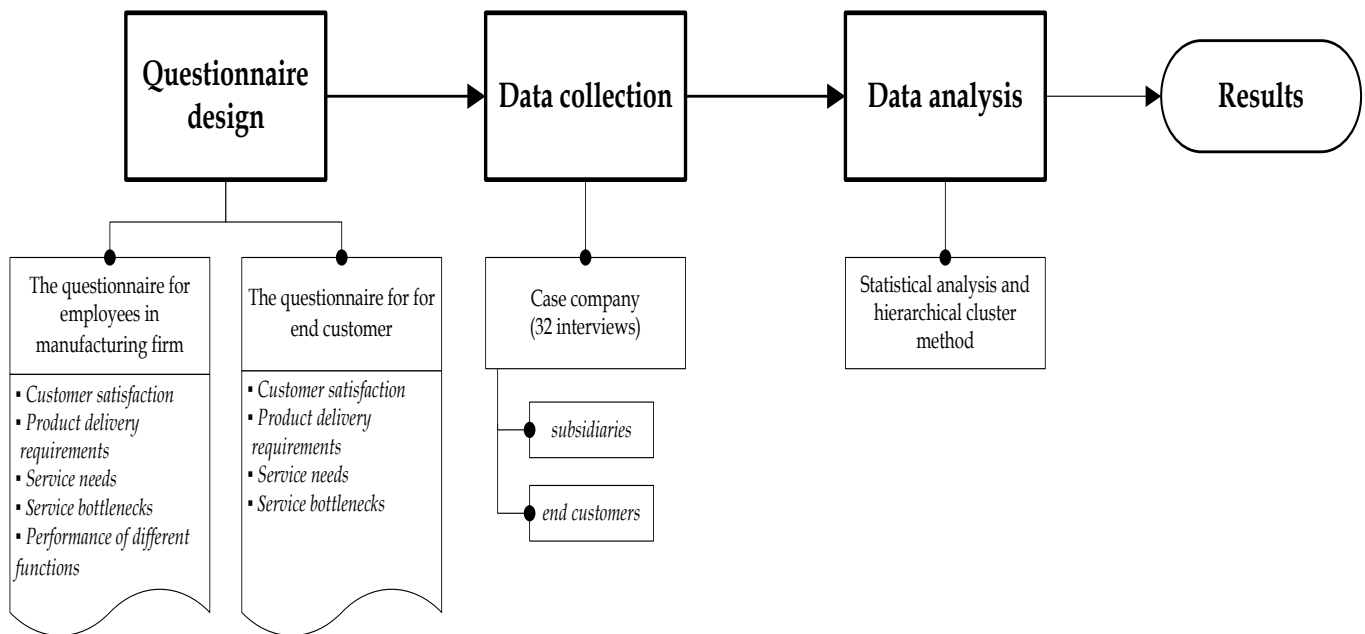


Figure 4: Research design.

3.2 Secondary data

If the data has been previously collected in a variation of context, one can say that this data is the secondary data (Lekvall and Wahlbin, 1993, & Eriksson and Wiedersheim-Paul,

1997). Hence if the person carrying out the research has not directly been in charge of collecting the data then it is said that he has been using the secondary data (Patel and Davidson, 1991)

3.3 Primary data

If the data is gathered or collected directly by the researcher is called the primary data (Lekvall and Wahlbin, 1993, & Eriksson and Wiedersheim-Paul, 1997) Factors such as surveys and interviews, observations and firsthand information are good examples of primary data (Patel and Davidson, 1991). Hence one can always say that if the researcher has been directly in charge of collecting the data then the data is indeed primary. In this thesis the primary data has been taken advantage of in positive and simultaneously descriptive data. Within the boundaries of this master thesis, the data, found based on the investigation of the dominant manufacturing system in the targeted company, is positive research. In the future chapters of this thesis the results of the mentioned descriptive investigations will be presented and processed.

3.3.1 Collecting the primary data

As it was mentioned earlier, the main concern and cornerstone of this thesis is the Vacon's strategy for production and meeting the customers need. It is quite obvious that when dealing with these types of studies the case study happens to be the most favorable and common method of research (Yin, 1994, p. 1). The objective of the case studies are said to have a specific advantage when an answer to a "how?" or "why?" question is demanded over a rather contemporary rank of happenings on which the researcher has no control or dominance (Yin, 1994, p. 1). The research taken place by this thesis is a descriptive study of the situation in Vacon with regards to the purpose of the company and their aims and

accomplishments. “How?” and “Why?” questions have been the main concern for the generation of a full description of procedures out of the control of the researcher. Due to all these circumstances, the case study approach seems to be the most suitable way for handling the research. It is worth mentioning that the case study taking place in this thesis is in the field of qualitative research. The following characteristics, described by Bryman, (1997, pp. 75-85) belong to qualitative case studies:

- *Observing something from somebody else’s perspective.* The main idea behind the qualitative research is to in fact see things, norms and values from the questioned person’s eyes and perspectives.
- *Descriptive research.* It is of an immense importance to note and mention all the small details about the explored matter and this can only be achieved by understanding the issue completely from the questioned person’s point of view.
- *Contextual research.* The aspiration of the research of the events, actions and people involved, in the qualitative nature and context is called the contextual research.
- *Process perspective.* The content of the research not being static over a time period is the main concern. The time perspective is said to be of an immense importance in qualitative. This leads to the observation of modification during the investigation.
- *Flexibility and lack of structure.* An open, flexible and also unstructured method is needed for qualitative research strategy. This is to avoid any sort of incorrect research frame. Unexpected matters can be highlighted and addressed by this method during the research process.

- *The view of theory and concept.* The qualitative researchers tend to formulate theories and concepts before the happening of the actual research. These researchers tend to deal with theory formulation during the gathering of the empirical data.

The above mentioned factors seem to be quite accurate when dealing with the actual research. This can easily be seen during the analyzing of the questioners on which this thesis is based upon. And as it was theoretically the selection and the gathering of the theories was not completely done until the finishing point of the case study. The purpose of qualitative method of research is to grasp a better understanding in comparison to the proportional and fragmental understanding gained from the Quantitative research (Patel and Davidson, 1991). The main objective of the qualitative research is to understand and deal with the details as a whole. This has been the main objective throughout this thesis.

According to Yin (1994, pp. 90-94), it is advised to use various sources of data when dealing with a case study research. In case studies there are six main ways for collecting information and evidences. This master thesis has been taking advantage of the following three methods for gathering data:

- *Questioners,* Thesis have been the biggest and the most important source of information for this master thesis. This method of collecting data is rather strong and helpful due to its insightfulness and focus on the case study. However one should always note that the questioners do indeed have some weaknesses as well. Things such as inaccuracy, reflexivity and possibility for bias happen to be the weaknesses of the questioners (Yin, 1994, p.80). The main goal of the questioners in various qualitative researches is collect data dealing with the respondent's ideas and thoughts about the particular matter being researched on (Merriam, 1994, pp. 86-87). The questioners were prepared in fashion which enabled us to have a wide horizon and spectrum on departments for which the production strategies and delivery system are of immense importance.

- *Documentation*, This method has the advantage of being rather stable, accurate and also able to cover a vast range of fields being researched. However lack of access to documents seems to be the biggest weakness of this method. Factors such as biases dealing with selection and reporting and also irretrievability happen to be the other weaknesses of this method Yin, 1994, p. 80). Documents such as the free comments of the internal customers as well as the external customers seem to be the most important pieces of documentation in this master thesis. It's worth mentioning that this documentation has been taking place in synchronization with the questioners.
- *Direct observations*, these remains to be a minor section of the whole research and has been taking place during the time the questioners were handed out to the feed backers. One of the main strength of this method is the fact that it is able to cover the whole context of the research. But the weaknesses are reflexivity and selectivity as well as high usage of the resources (Yin, 1994, p. 80). The main reason behind the observations was to collect data about various customers' perspective without the usage of any scheme. The observation method can be divided to two methods of structured and unstructured techniques. This thesis mainly covers an unstructured technique for observation and can be divided (Patel and Tebelius (Ed), 1987, p. 96 and 98). During these observations it was highlighted that the feedback givers have been both commenting on the past issues as well as the present matters.

After the collection of the main primary data the processes of systemization, collecting and analyzing had taken place. It is worth mentioning that the data have been chosen from the performed case study and translated to information taken from the research findings.

3.3.2 Validity and reliability

Reaching a valid and reliable result via ethically accepted methods is the main struggle of every research as well as the qualitative method used in this thesis (Merriam, 1994, p. 174). One can always claim that achieving valid and reliable results are much more important in qualitative research in comparison with experimental methods of research. This is due to the fact that in qualitative research the whole process has to be carried out first and then the researcher can decide whether or not the research has the necessary validity and reliability bars. In the following sections of this thesis, the concepts of validity as well as reliability are being highlighted.

Validity construction

The validity construction is rather difficult to be reached in a case study (Yin, 1994, p. 34). The case study method has always been accompanied by a number of critics stating that the investigation done via case studies do not have the ability of operational measure development. However, many believe that if the research is capable of measuring the things which are in researchers mind, then the level of construct validity is determined to be rather high. However, one can always say that there is no simple method for validity determination (Yin, 1994, p. 68). Last but not least, this thesis is not necessarily concerned with the concept of construct validity.

Internal validity

The main task for internal validity is determining how well the results are when it comes to practice in the real world (Merriam, 1994, pp. 177-178). It is a fact that the researcher's main duty is providing the respondent's view in a subjective manner about various objectives. Hence one can always claim that when it comes to qualitative research, the internal validity is of an great importance. In a case study, securing the internal validity can take place by six fundamental strategies (Merriam, 1994, pp. 179-180). The first strategy used in this paper is taking advantage of the participating respondents in ensuring the

trustworthiness of the results of this paper. This method is called the participants control. Secondly, the thesis supervisor and some other classmates have been giving feedbacks and comments about the findings of this thesis. Hence, horizontal perusal and criticism have been used in this thesis as well.

External validity

If the researcher is able to categorize the results and findings of a research beyond the instant case study, one can claim that external validity is presented in the research (Yin 1994, pp. 35-36). According to various authors and researchers, low external validity happens to be a rather common weakness in most of the case studies. This is due to the fact that a single case is never capable of providing well enough bases for a good foundation of generalization. However many researchers also believe that the main purpose of case study happens to be particularization. This means that when a case study is the subject of a research, the researcher should have it in mind that the similarity of the subject to other studies is not the main concern. A case study might very well be able to shed light on the fields which are covered by other similar case studies.

The external validity of the case studies should be also determined via a different context. Case studies' main objective is to analytical generalization. However, in other methods such as survey research, the main objective is statistical generalization (Yin 1994, pp. 36-37)

Reliability

The main task of reliability is highlighting and diminishing factors such as errors and bias materials from the work or the study (Yin, 1994, p. 36). Reliability is also defined as the extent to which the results found from the study can be repeated (Merriam 1994, P. 180). The logic behind this explanation is that there is only one reality which yields to the same results every time it is used as the main objective. However this fact does not stand when it comes to qualitative researches. Researchers believe that every human has its own perspective when it comes to the same matter or objective, hence various viewpoints or

realities can be presented when different people are considering one objective. Consequently traditional perspectives lack the possibility of creating a reliable study.

One can always claim that when it comes to qualitative studies, reliability has to be reached via other techniques. One of the techniques to reach reliability is to pay close attention to the concept of validity. However internal validity is impossible to be reached in the lack of reliability (Merriam, 1994, p.181 & Robson, 1997, p. 67). Therefore in order to increase the concept of reliability in a qualitative study, one would have to up lift the internal validity in that study.

3.4 The primary and secondary data analysis

Analyzing a topic contains the examination of the various factors by which the whole subject is consisted of (Abate (Ed) et al., 1996, p. 48). With this in mind, analyzes have been taking place throughout this thesis as a whole which happens to be a general approach in case of qualitative research. One should always keep it in mind that the information gathering and the analyses have to be taking place accordingly and simultaneously (Merriam 1994, p. 136). However, this does not mean that the analyses are fully done once the information gathering has been completed. In fact after the data gathering, the analyses and their intensity enter a new level in which the data is being viewed and examined closely and painstakingly.

Case study researches are basically consisted of three main types of analysis (Yin, 1994, pp. 106-115). “explanation-building” analysis happens to be the most commonly used type of analysis in case studies and it also happens to be the method used in this thesis as well. The main objective of this method is to explain the reasons of what, why and how things are taking place in a case study (Robson, 1997, p. 379). One of the main tasks of this approach includes the construction of a theoretical frame work and making a comparison between the findings of the research with the already existing theory on the topic.

3.5 Questionnaire design

The questionnaire used in this study was designed according to related literatures and users' and experts' opinions. After the draft was completed, a pretest was performed on experts and users in case company to modify items with ambiguous expressions. Therefore, questionnaire respondents could understand the questions in the formal survey and the content validity of the questionnaire could be ensured.

The questionnaire contained two parts. The first part includes standard questions scaled from one to five where 1="low" and 5="high". The second part was dedicated to individual free comments given by respondents. The questionnaire was designed for two groups. One is for managers and experts as internal customers in different subsidiaries, and one is for ultimate customers. The items of the questionnaire for internal customers are existing products, new generation products, delivery, service offering, and customer service. The items of the questionnaire for external customer are the same as internal ones.

Customer satisfaction surveys have been used to measure the level of customer satisfaction. It is a fact that questionnaires are used as a common technique for assessing customer satisfaction.

The questionnaire has been developed by a consulting company and the case company's experts. Data was collected in a global sales meeting that was held in Mexico in the year 2011.

Below there is an empty sample of our questioner:

Name, role, company:	
Background with Vacon:	

Customer satisfaction

Rating	Rating – 1 low, 5 high						Comments
How satisfied is your company with Vacon's...							
Existing products	1	2	3	4	5	NA	
<i>Scope of offering [clear gaps?]</i>							
<i>Performance and quality</i>							
<i>Technology</i>							
<i>Availability of information</i>							
<i>Customization</i>							
M-generation products							
<i>Scope of offering</i>							
<i>Performance and quality</i>							
<i>Technology</i>							
<i>Meeting of customer needs</i>							
<i>Customization</i>							
Delivery							
<i>Delivery time</i>							
<i>Delivery accuracy</i>							
<i>Combining deliveries</i>							
Service offering							
<i>Scope of offering [clear gaps?]</i>							
<i>Performance and quality</i>							
<i>Delivery and delivery times</i>							
Customer service							
<i>Ease of access</i>							
<i>Technological expertise</i>							
<i>Availability of information</i>							
<i>Response time</i>							

Product delivery requirements

What are the delivery requirements for our products?					
Do your deliveries needs vary between different products? How?					
Product type	Delivery time (working days)				Comments
	1-3	3-7	7-14	14+	
Air cooled					
Liquid coold					
How critical is short delivery time (e.g. compared to price)? (High/Medium/Low) [circle+comments]					
What other requirements do you have for product deliveries?					
How do you see your delivery requirements will evolve in future?					

[illegible]

Delivery and logistics	
Services/after sales	
Other	

RESULTS

4.1 Data analysis

SPSS has been the data analyzing tool for analyzing the statistical data collected from the questionnaire. The main objective used for analyzing the data was through the analysis of correlation and regression. In this study we have used five following factors: existing products, new generation products, delivery, service offering and customer service (see Figure 2) for measuring customer satisfaction and calculated the mean value resulted from them. In addition to that, we noticed two other important factors affecting the customer satisfaction quite immensely. Effective communication and rapid service processes happen to be these important factors. The mentioned areas can be considered the key service processes for manufacturing firms. The results can lead the manufacturing firms for improving their value added services in addition to enabling them to operate closer to their global customers.

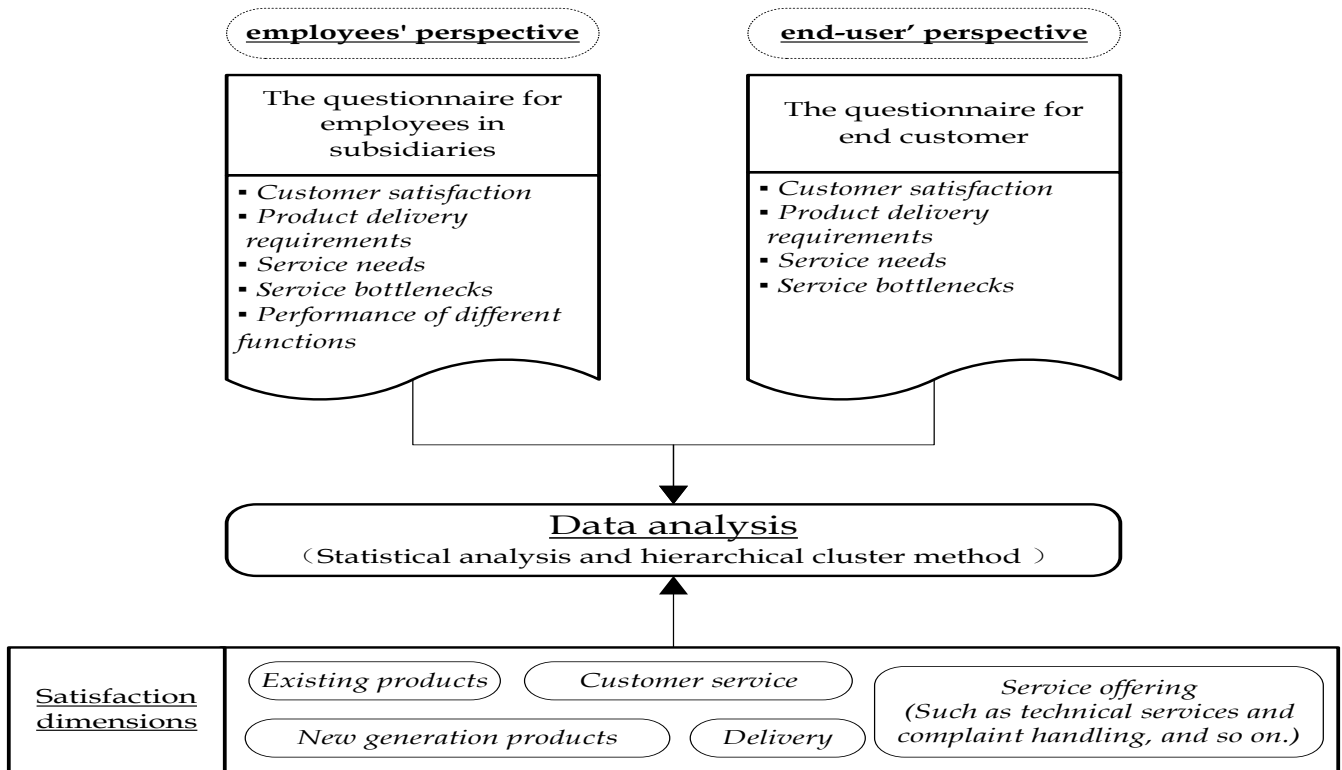


Figure 5: Satisfaction dimensions use in the data analysis process

4.2 Variability efficiency

By calculating the mean and the standard deviation of the ratings in all the questioners, we were able to calculate the variability coefficient in excel sheet. One should always bear in mind the variability coefficients to be ranking below one for the ratings to be accurate and accepted. In our case all the variability coefficients were ranking below one, this indicated the fact that they all stand quite accurate for the given ratings. Below we can observe the graph of these efficiencies.

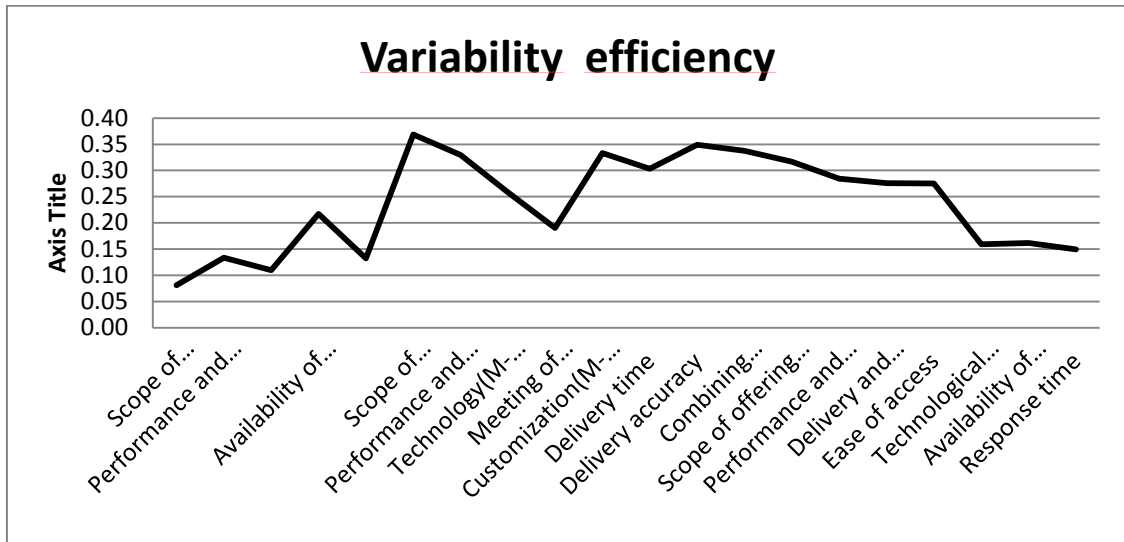


Figure6: Variability coefficient.

The X-axis is containing the factors which are indicated in the questioners by the case company. The Y-axis in the other hand contains the number of the variability coefficients (J. Koskinen, D. Sahebi, 2013, P. 2).

4.3 Satisfaction between products and services

During the analysis, we have managed to see a certain type of relation between the satisfaction of the customers related to the products and their satisfaction level from the service rate. This satisfaction rate could be measured or shown according to the regression graph standards. Fig 3 shows the regression graph of this relation between the product quality and their services in general.



Figure 7: Satisfaction correlation between product and service

As we can easily observe from the graph mentioned previously (fig 3.), there is an upwards slopping line to the right, forming the regression relation between the satisfaction of products and satisfaction of services. The chart shows us that there is a medium positive relation between these two factors. Consequently, as the rate of the satisfaction from the quality of the items goes higher, the satisfaction from the services follows accordingly; hence increase in satisfaction of the customers from the items results in the increase of the satisfaction from the services (J. Koskinen, D. Sahebi, 2013, P. 3).

4.4 Correlation between the technology of existing products and the availability of information

The figure below is closely studying the correlation existing between the technology of existing products and the availability of information. As it is quite obvious from the graph, there is rather small correlation between these factors. This relation happens to be a slight negative correlation between technology of existing products and the availability of information. Generally we can claim that the slop of the curve is so small that the factors do not have any relations with one another. Consequently, we can say that regardless to the technology in already existing products, availability of information turns out to be independently a very crucial factor.

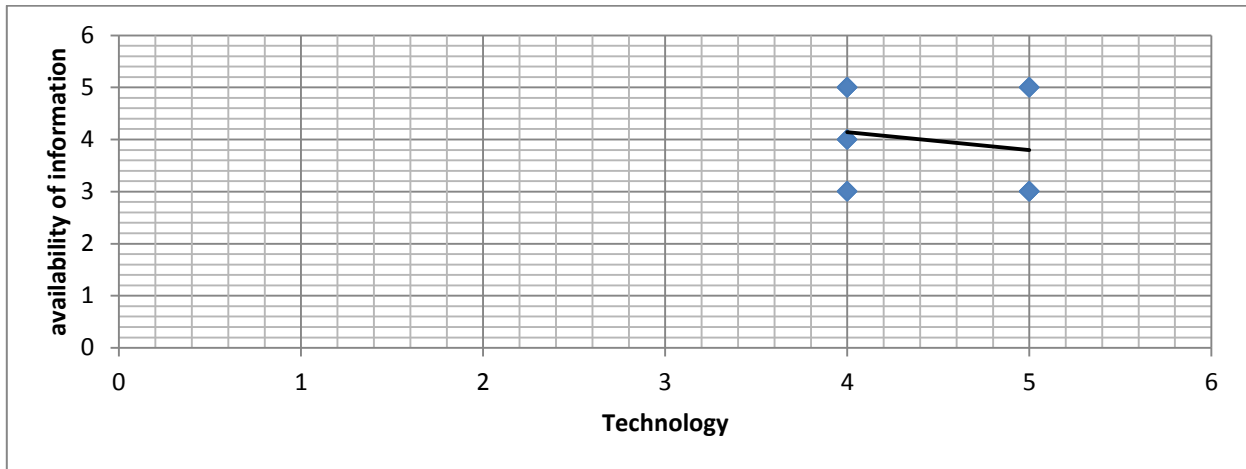


Figure8: Correlation between the technologies of existing products and the availability of information

4.5 The free comment analysis

The table below includes a number of operations and factors taking place in the case company. The column in the right hand side belongs to the free comments and feed backs given by the customers. Some comments indicate that there happen to be a lack of communication between the marketing and R&D. The delivery times were also one of the main issues of most of the feedbacks, stating that the company needs to work more on their delivery times. New generation products seemed to be attracting some amount of negative attention due to their problems related to the quality and low price competitiveness comparing to the Japanese products. Moreover, it was stated by various customers that some of the new generation products have been launched too early (J. Koskinen, D. Sahebi, 2013, P. 3).

Table 1: Key Findings

KEY FINDINGS	NUMBER OF BEING REFERED TO
Technology <ul style="list-style-type: none"> – Case company is keeping up with the new technologies – Company does not have the leading edge yet but is one of the best ones in the market – IEC 611 31 tools was mentioned to be the main reason of cooperation with the case company – More product features and product solutions are needed 	Technology <ul style="list-style-type: none"> – All thirteen feedback givers were satisfied with the level of existing technology – Need for fieldbus was mentioned to by 1 customer – IEC 611 31 tools were mentioned by 1 customer – More product features and solution mentioned by four customers
Performance and quality <ul style="list-style-type: none"> – New generation product was mentioned to be an unsure topic (information flow) for a number of the customers – New generation product (small units) need price improvement to be competitive with Japanese products – Some of the products have minor problems with speed of communication 	Performance and quality <ul style="list-style-type: none"> – New generation product was mentioned to be 10% more expensive than the expected price by 1 customer – Uncertainty (information flow) about new generation was mentioned by 3 customers also quality improvements are needed in the future – New generation product (small units) price issues and compatibility was mentioned by 2 customers
Delivery and service <ul style="list-style-type: none"> – Improvements in delivery time and accuracy is one of the key issues – Combining delivery need to improve 	Delivery and service <ul style="list-style-type: none"> – Combining delivery was mentioned to be needed by one customer. – All thirteen of the customers wanted to have more faster or accurate delivery times – Delivery of the smaller spare parts for the purpose of service was said to be more accurate than the bigger parts by 3 customers.
Availability of information <ul style="list-style-type: none"> – Finding specific information in some specific cases (hard data) is rather difficult – The availability of information and the quality of need to improve – Responsiveness should be improved 	Availability of information <ul style="list-style-type: none"> – Existing products: information and communication need to improve mentioned by 7 customers – Service information: need to improve mentioned by 3 customers

Figure 1 shows that customer needs are getting changed constantly. The number of product features, customer's quality requirements and number of product variants are shifting upwards rather rapidly. On the other hand one of customer's requirements is that sales prices and delivery times should decrease too. Meaning, that manufacturing units should develop their operations all the time for the purpose of being competitive. One of the biggest challenges which are faced by firms is to decrease the time put in an environment where the numbers of product features are using a standard modular product design. Modularity assists manufacturing units in controlling the production process effectively, also supplier network much easier to control (J. Koskinen, D. Sahebi, H. Nikookar, W. Zhan, 2013, P. 3)

Business environment vary quite rapidly. In power electronics business there are various elements which influence the company's customer performance. We can identify the following trends in an upwards shift: the number of product variants, product features and quality requirements are increasing.

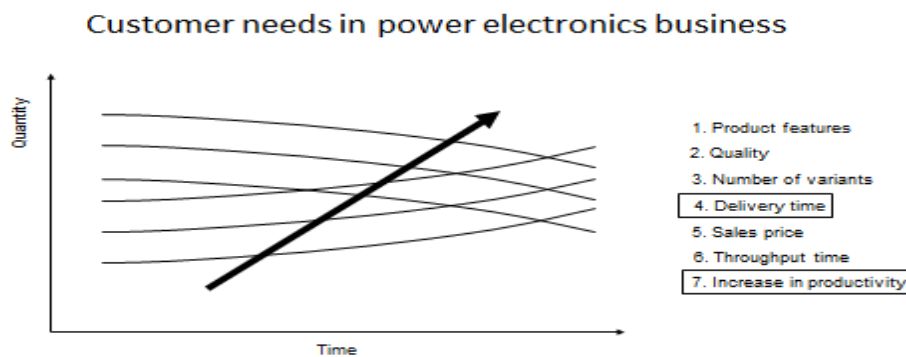


Figure 9: Main elements in a power electronics business environment

4.6 Production strategy

Based on study made and earlier studies as well as experience of the business segment, the case company launched strategy (see fig. 3) which is focuses on:

- Giving more customer value through effective network (including material flow and information flow)
- fast delivery time
- high level of quality
- cost efficiency
- fast time to market for new products



Figure 10: Connection to production strategy

4.7 Effective information flow

The latest IT technology is drastically improved and hence has the capability of enabling extended automated data collecting technology. However, most of the times there are no existing solutions or systems to test this ability. However, in the near future these kinds of

new solutions will be much more common. Based on the study, the case company is supposed to build up the same kind of system for business purpose, for collection, sharing and distributing the data, by the purpose of getting better customer support. These systems can be used for the purpose of improving information handling towards knowledge management system (J. Koskinen, D. Sahebi, H. Nikookar, W. Zhan, 2013, P. 4)

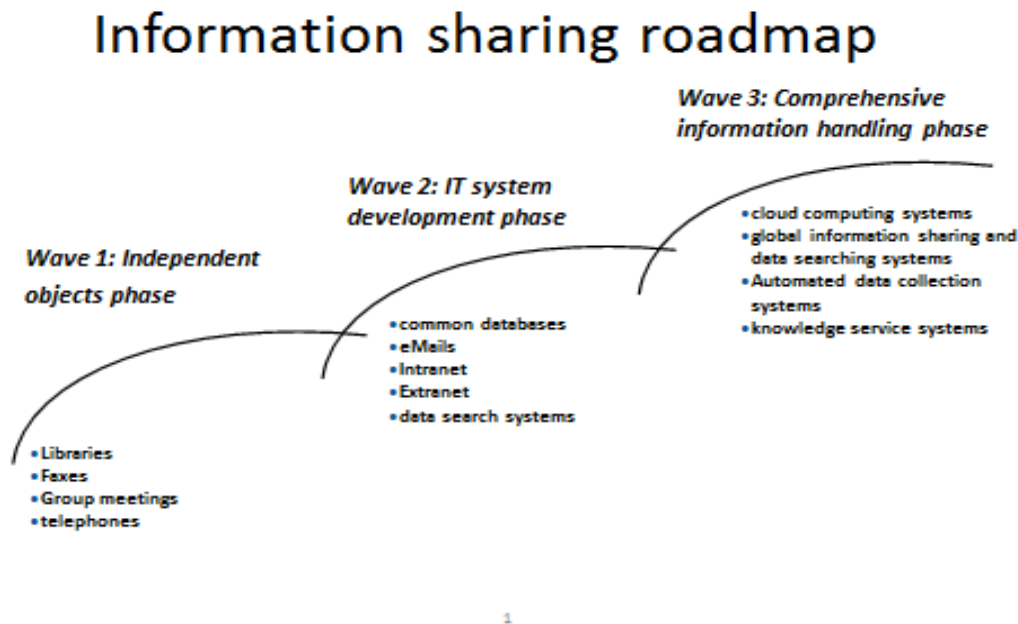


Figure 11: Information sharing roadmap

Knowledge service has been defined by being a service/ideology providing versatile ability to access and create information throughout the whole community. The service industry uses dedicated IT systems and software, on regular basis, as an interface towards the user. These systems are designed to fit their purpose by the owner of the service. These systems then make use of the majority of the databases which are set within the community (J. Koskinen, D. Sahebi, H. Nikookar, W. Zhan, 2013, P. 4)

The data collected from the questionnaires had been entered into SPSS and the correlation as well as the regression between the main factors of the questionnaire had been well analyzed. It is worth mentioning that the main factors of the questionnaires are the following: existing products, new generation products, delivery, service offering and customer service. As it was mentioned earlier, our questionnaire has been divided into two groups of external and internal customers. The following analysis and results were collected from SPSS respectively.

4.8 Correlation of the external Customers

The table below belongs to the analysis done on the correlation of the questionnaires belonging to the external customers. 12 questionnaires out of 13 were complete enough to be analyzed. This is because one of the questionnaires did not contain satisfactory amount of answers to be used by the SPSS program. From the table below we can see that which one of the factors are correlated with one another.

Table 2: Correlation of external customers

		Correlations				
		Existing products	New generation products	Delivery	Service offering	Customer service
Existing products	Pearson Correlation	1	.722**	.312	.623*	.658*
	Sig. (2-tailed)		.008	.323	.030	.020
	N	12	12	12	12	12
New generation	Pearson Correlation	.722**	1	-.152	.409	.207

products	Sig. (2-tailed)	.008		.638	.187	.519
	N	12	12	12	12	12
Delivery	Pearson Correlation	.312	-.152	1	.550	.623*
	Sig. (2-tailed)	.323	.638		.064	.031
	N	12	12	12	12	12
Service offering	Pearson Correlation	.623*	.409	.550	1	.559
	Sig. (2-tailed)	.030	.187	.064		.059
	N	12	12	12	12	12
Customer service	Pearson Correlation	.658*	.207	.623*	.559	1
	Sig. (2-tailed)	.020	.519	.031	.059	
	N	12	12	12	12	12

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

The numbers which have ** indicate that there is a correlation between factors and the rate of accuracy is 99%. But if the sign above a number is * it is stating that the existing correlation is 95% accurate, 4 % lower than the **. For example there is a 72% correlation between the existing products and the new generation products (J. Koskinen, D. Sahebi, H. Nikookar, W. Zhan, 2013, P. 5)

4.9 Regression analysis of the external customers

As it is quite obvious from the table below, all the factors happen to be significant, meaning that the regression analysis is valid amongst all the factors. It is worth mentioning that an

extra factor has been developed as the independent factor which is called the Overall Customer Satisfaction. The percentage numbers in overall customer satisfaction is the result of the mean of the values in all the other factors. One should bear in mind that the five other factors are considered to be dependent factors. The beta column in the table below shows the percentage, which belongs to every factor and the role it plays on the overall customer satisfaction. The percentage belonging to each factor is as stated below:

- Existing products 10%,
- New generation products 15%,
- Delivery 32%,
- Service offering 44%
- Customer satisfaction 27%

Table 3: Dependent Variable: Overall satisfaction

Coefficients

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
1 (Constant)	-8.327E-15	.000		.000	1.000
Existing products	.200	.000	.101	8.937E6	.000
New generation products	.200	.000	.149	1.569E7	.000
Delivery	.200	.000	.323	4.029E7	.000
Customer service	.200	.000	.272	3.221E7	.000

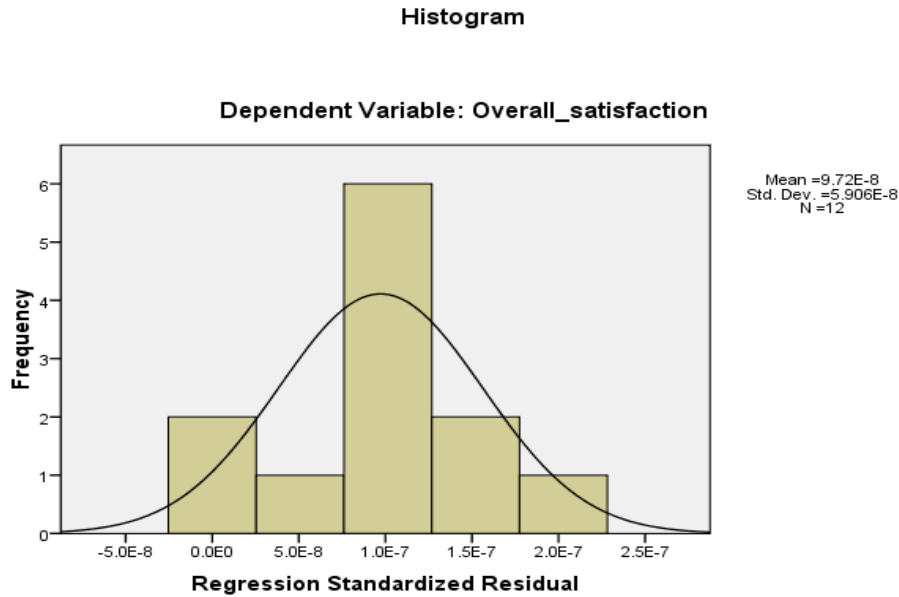


Figure 12: Histogram of dependent variable

4.10 Correlation of the internal Customers

The table below belongs to the correlation analysis of the questionnaires belonging to the internal customers. 17 questionnaires out of 18 were liable enough to be analyzed. The numbers which have ** indicate that there is a correlation between factors and the rate of accuracy is 99%. But if the sign above a number is * it is stating that the existing correlation is 95% accurate, 4 % lower than the **. However according to SPSS analysis for the internal customers, there is no correlation amongst any of the factors (J. Koskinen, D. Sahebi, H. Nikookar, W. Zhan, 2013, P. 5).

4.11 Regression Analysis of internal customers

As it is quite obvious from the table below, all the factors happen to be significant, meaning that the regression analysis is valid amongst all the factors. It is worth mentioning that an extra factor has been developed as the independent factor which is called the Overall Customer Satisfaction. The percentage numbers in overall customer satisfaction is the result of the mean of the values in all the other factors. One should bear in mind that the five other factors are considered to be dependent factors. The beta column in the table below shows the percentage, which belongs to every factor and the role it plays on the overall customer satisfaction. The percentage belonging to each factor is as stated below:

- Existing products 18%,
- New generation products 25%,
- Delivery 34%,
- Service offering 43%
- Customer satisfaction 30%

Table 4: Dependent Variable: Overall satisfaction

Coefficients					
Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
1 (Constant)	6.661E-16	.000		.000	1.000
Existing products	.200	.000	.180	5.155E7	.000
New generation products	.200	.000	.256	8.160E7	.000

Delivery	.200	.000	.342	1.048E8	.000
Service offering	.200	.000	.434	1.131E8	.000
Customer service	.200	.000	.305	6.776E7	.000

Histogram

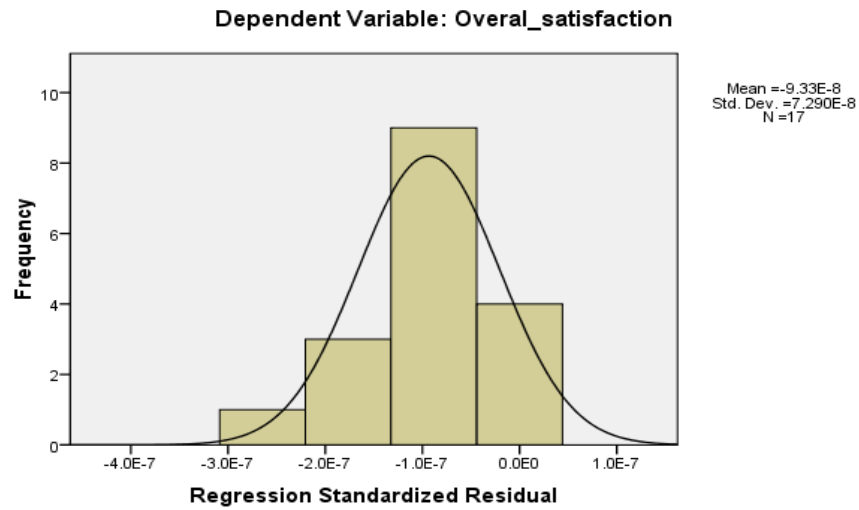


Figure 13: Histogram of dependent variable

4.12 Communication and service process improvement

Table 5: Histogram of dependent variable

Comments on Service offering and Customer service	Internal	End Customer	Total
Communication improvement	8	10	18
<ul style="list-style-type: none"> • Responsiveness • Difficult to contact • Information flow 			

<ul style="list-style-type: none"> • Information availability • 24/7 reachable 			
Service process improvement <ul style="list-style-type: none"> • Paper work / reports • Tools • Service portfolio • Documentation 	12	3	15
More resources are needed	5	2	7
Faster lead time is needed	2	5	7
Training improvements	1	1	2
Total	28	21	49

According to the Table 5, the communication and service process improvement are of immense importance for companies which function on international level. As we can observe from Table 5, communication is the most important factor for the end customers. This is mainly because getting 24/7 customer service is very valuable to end customers all over the world, just in case a problem comes up in a surprising fashion. However, the internal customers believed that the service process improvement happens to be the most important factor. This might be partially due to the fact that more documentation and tools are required in the subsidiaries for supporting the customers at the best positive way (J. Koskinen, D. Sahebi, H. Nikookar, W. Zhan, 2013, P. 6).

DISCUSSION

Entrepreneurial strategy, effective processes, innovativeness and dynamic capabilities which take environment changes to the account are only one of the instances for developing a more agile customer oriented firm. Only with working in collaboration with customers as well as partners, it is possible to have a deeper understanding of customer needs deeply. In

order to reach faster, flexible, and more agile processes for supporting the changes in customer needs. The main objective of this study was understanding and analyzing factors that are most important to the customers in a power electronic business industry. One of the main findings was the importance of effective information flow in a global business. This is directly related to the communication of technical, delivery and installations as well service matters. It seems like the globalization level influences the quality of information and speed of the information flow. One can always summarize that effective information flow; flexibility, speed and responsiveness require more focus and attention in a fast changing world. Delivery accuracy is the main key, while short delivery time is believed to be competitive factor (J. Koskinen, D. Sahebi, H. Nikookar, W. Zhan, 2013, P. 7)

It is worth mentioning that our study has certain limitations. This is due to the fact that only one company was taken into consideration and studied in depth. This was accompanied with a limited amount of customer respondents. Further research and studies are needed on the fast or rapid service process improvement due to its crucial role on enhancing and improving the company capabilities in dealing with various customer demands.

As it was quite obvious in the body of this case study, the main objective of this research has been revolving around the factors which can directly influence the customer satisfaction. This could be valuable when companies prepare and design their service strategies. The process of gathering information has been taken care of by the use of questionnaires. These questionnaires have mainly covered the five crucial concern of our analysis. These main points or concerns are as following:

- Existing products
- New generation products
- Delivery
- Service offering
- Customer service

During the analysis of the gathered data a specific statistical data processing program, named SPSS, was used to sort out the data and help us with finding the correlation between the factors and the concepts affecting the customer satisfaction. During the studies, the main concern of the research had been finding out how and to what degree the service offering can affect and be linked to customer satisfaction. During our analysis we found out that according to the external customers there is indeed a correlation between the main five factors of the questionnaire (refer to Table 1 and 3). However, the internal customers believed that there is no positive correlation between mentioned factors (J. Koskinen, D. Sahebi, H. Nikookar, W. Zhan, 2013 p. 7)

This might be due to the new generation products, being made of complete new components and the product development is based on the new innovations. As it was stated in the body of this thesis, the respond to the questionnaire came from two different groups. One group of the respondents was the internal customers, who were the managers and experts of the daughter companies in various countries. The other group of respondents belonged to the end customers. It is worth mentioning that the five stated above factors were taken into consideration according to the influence they have on the overall customer satisfaction (J. Koskinen, D. Sahebi, H. Nikookar, W. Zhan, 2013 p. 7)

The internal customers believed that service offering happens to be the most crucial factor influencing the overall customer satisfaction. In accordance with our data analysis from the internal customers, service offering influenced the customer satisfaction by 43 percent. According to the calculations carried out about the respond of external customers, service offering influenced the overall customer satisfaction is affected 44 percent. It is worth mentioning that the highest rank in percentage amongst the five analyzed factors was given to the service offering itself. Additionally, based on the analysis from table 5 one can claim that effective communication and rapid service processes indeed have influence the dynamic capabilities of the company in a positive manner (J. Koskinen, D. Sahebi, H. Nikookar, W. Zhan, 2013 p. 7).

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